AMENDMENTS

Please amend the claims as follows:

Claims 1-70 (Canceled).

71. (currently amended) A method of detecting a first molecule or a first molecular complex in a liquid or gel, comprising:

(a) providing a single ultra-microelectrode array, said ultra-microelectrode array comprising at least two electrode structures, wherein a second molecule is bound to the surface of the microelectrode structures and comprises a ~~**bonding**~~ group that can bind the first molecule by a chemical reaction or by complexing, the second molecule being capable of binding to a first molecule or molecular complex to be detected;

(b) contacting the first molecule or a first molecular complex in the liquid or gel with the ultra-microelectrode array;

(c) producing an electric field between the electrode structures;

(d) measuring changes in current or potential between the electrode structures, whereby the changes in current or potential are caused by the first molecule or the first molecular complex that binds to the second molecule; and

(e) detecting the presence of said first molecule or first molecular complex by observing said change in current or potential;

wherein said first molecule or first molecular complex is selected from the group consisting of nucleic acids, peptides and proteins; and

wherein each of said electrode structures comprises a surface layer of

conductive material, is insulated from each other and is either a layer on a planar insulating support material, or is incorporated in said planar insulating support material and wherein the space between the electrode structures is about 1 µm or less to approaching the size of a large molecule complex.

72. (PREVIOUSLY PRESENTED) The method according to claim 71, wherein the second molecule is positioned on an electrode or to a surface of a gap between electrodes by chemical binding, adhesion, or condensation reaction.

73. (PREVIOUSLY PRESENTED) The method according to claim 71, wherein the measuring of the changes in current or potential is performed using impedance spectroscopy.

74. (PREVIOUSLY PRESENTED) The method according to claim 71, wherein the second molecule is bound via a binding compound on the surface of the electrode structures.

75. (PREVIOUSLY PRESENTED) The method according to claim 71, wherein the second molecule binds to the surface of the electrode structures via physical or chemical binding. or is bound via a binding compound.

76. (PREVIOUSLY PRESENTED) The method according to claim 71, wherein the second molecule binds to surface of the electrode structures via self-assembling.

77. (PREVIOUSLY PRESENTED) The method according to claim, 74 wherein the second molecule is bound to the binding compound on the surface of the electrode structures-via electropolymerization.

78. (PREVIOUSLY PRESENTED) The method according to claim 71, wherein said second molecule comprises an antibody, and wherein the first molecule or first molecular complex to be detected comprises an antigen that binds to said antibody.

79. (PREVIOUSLY PRESENTED) The method according to claim 71, wherein the second molecule binds the binding compound on a surface of the electrode structures.

80. (PREVIOUSLY PRESENTED) The method according to claim 71, wherein the second molecule comprises biotin.

81. (PREVIOUSLY PRESENTED) The method according to claim 71, wherein the second molecule comprises an antigen, and wherein the first molecule or first molecular complex to be detected comprises an antibody.

82. (PREVIOUSLY PRESENTED) The method according to claim 71, wherein the second molecule comprises a first polynucleotide, and the first molecule or first molecular complex to be detected comprises a second polynucleotide capable of binding to the first polynucleotide.

83. (PREVIOUSLY PRESENTED) The method according to claim 82, wherein the second polynucleotide binds to the first polynucleotide via hybridization.

84. (PREVIOUSLY PRESENTED) A method according to claim 71, wherein said first molecule or molecular complex is a third polynucleotide that hybridizes to the second molecule which is a second polynucleotide that is hybridized to a first polynucleotide, wherein said first polynucleotide is bound to a binding compound on said ultra-microelectrode array.

85. (PREVIOUSLY PRESENTED) The method according to claim 71, wherein the insulating material is selected from the group consisting of silicon compounds, glass, ceramic and organic polymers.

86. (PREVIOUSLY PRESENTED) The method according to claim 71, wherein the insulating material is selected from the group consisting of silicon oxides, nitrides, and plastics.

87. (PREVIOUSLY PRESENTED) The method according to claim 71, wherein the electrode structures are arranged as a multi-layer structure with each layer insulated from the others.

88. (PREVIOUSLY PRESENTED) The method according to claim 71, wherein the changes in current or potential are measured sequentially, in parallel or simultaneously.

89. (PREVIOUSLY PRESENTED) The method of claim 71, wherein said layer of conductive material is selected from the group consisting of a

noble metal, a carbon material and both a noble metal and carbon material.

90. (PREVIOUSLY PRESENTED) The method of claim 89, wherein said noble metal is selected from the group consisting of gold, platinum and iridium.

91. (PREVIOUSLY PRESENTED) The method according to claim 71 wherein each of the electrode structures is a layer sufficiently thin that the ultra-microelectrode array is substantially planar.

92. (PREVIOUSLY PRESENTED) A method according to claim 87, wherein the multilayer electrode structures are stacked, and comprise crossover points that are insulated from one another.